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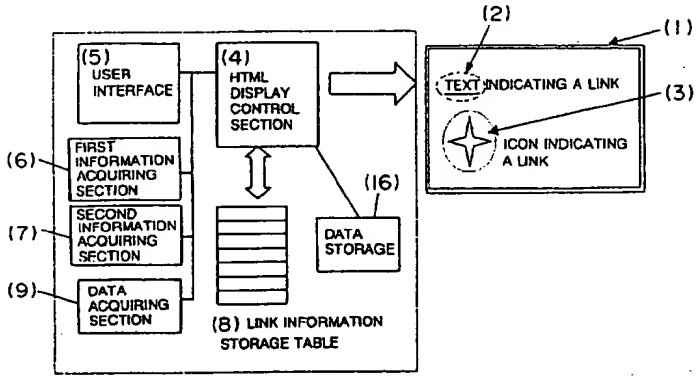
(54) Display device and hypertext display sytem for displaying hypertext

(57) An HTML display device, for reducing a waiting time for connection to a site on a network where HTML data is held; time and effort for communication over a plurality of sites; and communication cost.

The hypertext display device has a user interface (5) (a designating unit) for designating an object (informing data) such as a linktext (2) attached with an underline which is contrived for telling a user of the presence of link information in HTML data. When an object is designated by the user interface, information which shows a location of the displayed HTML data including the object is acquired by a first information acquiring unit (6) and link information designated by the user interface is acquired by a second information acquiring unit (7). Acquired information from each is stored in a table (8) in a pair. The displayed HTML data and the HTML data indicated by the link information are sequentially acquired by a data acquiring unit (9) referring to the table and then stored in a data storage unit (16).

FIG. 1



EP 0 977 133 A2

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Description

[0001] The present invention relates to a hypertext display device and a hypertext display system, and is a technique adaptable to a browser for displaying hypertext data used in WWW of the Internet, an Intranet and the like.

[0002] Internet Explorer of Microsoft Inc. and Netscape Navigator of Netscape Inc. are famous each as a browser for displaying hypertext information present in WWW (World Wide Web) of the Internet, an Intranet and the like. Using the browser, a location where hypertext information is stored is designated and a content of the hypertext information is displayed on a personal computer. In a user interface, a user generally designates URL (Uniform Resource Locator) information directly by keyboard entry or indirectly by clicking on an icon or a character string on the display, which shows a link to other data.

[0003] Currently, a target piece of hypertext information is retrieved from among a tremendous amount of hypertext information held on WWW by tracing link information, for example taking advantage of a directory service.

[0004] Retrieving by tracing the link information has problems that (1) operation is complex and a user has to get familiar with the operation, and (2) since there are many accesses to hypertext data till the user reaches a target piece of hypertext information, time and communication cost to retrieve the information are required especially when there is employed a slow connection condition by dialing-up through a telephone line.

[0005] There comes a further problem that (3) hypertext data of the Internet or the Intranet are generally complexly linked to each other by link information and thereby, there is a possibility that a user may be confused in the course of tracing the link information. Still another problem arises that when a hypertext is displayed in an off-line state, in which the hypertext display device is not connected with a network, the user cannot access linked side information in the display if the linked side information is present on the network. In this case, there is necessity that the user has to memorize or note an address (URL as an example) of the linked side information and has to access to the information later. This work is cumbersome and therefore disturbs a smooth reading of hypertext information on WWW.

[0006] On the other hand, there is an established technique in which a small-sized portable terminal called a "mobile" is used and connected to WWW of the Internet. Concerned with the mobile, performance or a memory capacity is limited, a browser with a simple function is loaded thereon. For that reason, when the mobile is connected with the Internet, information which the mobile can obtain is limited. For example, some mobiles cannot display image data.

[0007] Therefore, if the user wants to obtain an image datum, he has to access the same site again using an ordinary personal computer, and in that case, the same operation is repeated in the computer in order to access the target information, which is further cumbersome.

[0008] It is a first aim of the present invention to provide a display device for displaying hypertext by which there can be reduced a waiting time for connection to a site on a network where the hypertext is held, time and effort for communication over a plurality of sites, and a communication cost, and besides, a user is not confused in the course of tracing link information.

[0009] It is a second aim of the present invention to enable a flexible operation that even in the case where a hypertext datum is displayed in an off-line state and the hypertext datum links to hypertext present on the network, the link information is temporarily stored and later when connection to the network is established, linked side hypertext information can be read, and thereby to provide a function which contributes to smooth reading of WWW.

[0010] The display device is a device to display hypertext data which includes link information for other information such as described on a home page held at a site on WWW of the Internet and to be adapted to a browser for operating on a computer.

[0011] A first aspect of a display device of the present invention comprises: a designating unit for designating informing data corresponding to link information to be stored from among identification data showing the presence of link information in hypertext data displayed on a display; a first information acquiring unit for acquiring information showing a location of the displayed hypertext data including the informing data designated by the designating unit; a second information acquiring unit for acquiring the link information specified by the informing data designated by the designating unit; a storage unit for storing the location information acquired by the first information acquiring unit and the link information acquired by the second information acquiring unit for correspondence to each other; and a data acquiring unit for acquiring the hypertext data from the location according to the location information and the hypertext data indicated by the link information, both the location information and the link information being stored in the storage unit.

[0012] When adopting such construction, the link information on a hypertext datum which is desired to be acquired later, though not immediately, is stored in the storage unit and the hypertext which is indicated by the link information stored in the storage unit can be acquired at a time when needed.

[0013] The informing data showing the presence of link information in hypertext data are shown as an icon, a figure, a photograph, text with a color or an underline attached thereto in the hypertext data displayed by a browser and a relation to another datum is achieved by a tag for a hypertext link (generally, the tag for a link of HTML is indicated by ⟨A⟩ and called "anchor").

[0014] The designating unit is, for example, a user

BNSDOCID: <EP_____0977133A2_I_>

interface such as a mouse and designation is performed, for example, by double clicks on a part where the presence of link information is indicated.

[0015] Information which shows a location of the hypertext data including the informing datum designated by the designating unit is acquired by the first information acquiring unit and the link information specified by the designated informing datum is acquired by the second information acquiring unit.

[0016] The location information and the link information of the hypertext datum acquired by both acquiring units are related with each other and stored in the storage unit. For example, the information pieces are stored in a table developed on a memory in a corresponding manner with each other.

[0017] In the data acquiring unit, the hypertext data are acquired from the locations according to the location information and the hypertext data indicated by the link information are acquired (both the location information and the link information are stored in the storage unit).

[0018] In that case, when the location of hypertext datum held on WWW server is required to be accessed, it is preferable that a communication means is activated and automatically connected to a network.

[0019] If necessary, hypertext data which have been acquired by the data acquiring unit are stored in a data storage unit, for example on a hard disc, a memory or the like.

[0020] Preferably, data acquirement by the data acquiring unit is automated, by generating an event which works as a trigger.

[0021] In other words, there is provided an event generating unit for generating an event at an appointed time. The data acquiring unit acquires the hypertext data from a location according to the location information and the hypertext data indicated by the link information when the event generating unit generates the event.

[0022] Connection with a network is established by a communication unit and then an event can be generated by the event generating unit on condition that the communication unit has connected with the network. In this case, as well, it is possible that when the event is generated by the event generating unit, the data acquiring unit acquires the hypertext data from a location according to the location information and the hypertext data indicated by the link information through the network.

[0023] While in the above description, an event is generated at an appointed time or on condition of connection with a network, alternatively when an appointed event is detected by the event detecting unit, the data acquiring unit acquires the hypertext data from the location according to the location information and the hypertext data indicated by the link information.

[0024] In a first aspect of a method for displaying hypertext data according to the present invention, a method for displaying hypertext data including link information indicating an existence of a link to appointed information, comprises: a step of designating informing data corresponding to the link information to be stored from among informing data which show the presence of link information in the hypertext data displayed on a display; a step of acquiring information which shows a location of the displayed hypertext data including the designated informing data; a step of acquiring link information specified by the designated informing data; a step of storing the acquired location information and the acquired link information of the hypertext data for correspondence to each other; and a step of acquiring the hypertext data from the location according to the stored location information and the hypertext data indicated by the stored link information.

[0025] The present invention can be applied to two or more information processing devices constituting a display device for displaying hypertext data including link information indicating existence of links to other data.

[0026] In other words, in a display system according to the present invention, a first information processing device comprises: a designating unit for designating informing data corresponding to the link information to be stored from among informing data showing the presence of link information in hypertext data displayed on a display; a first information acquiring unit for acquiring information showing a location of the displayed hypertext data including the informing data designated by the designating unit; a second information acquiring unit for acquiring the link information specified by the informing data designated by the designating unit; and a transmitting unit for transmitting the location information acquired by the first information acquiring unit and the link information of the hypertext data respectively acquired by the second information acquiring unit respectively to a second information processing device. On the other hand, the second information processing device comprises: a receiving unit for receiving the location information and the link information of the hypertext data which have been transmitted from the first information processing device; and a data acquiring unit for acquiring the hypertext data from the location according to the received location information and the hypertext data indicated by the link information according to the received link information.

[0027] Here, application is made to a browser operating in one of the information processing devices, for example in a portable information terminal. The informing data showing the presence of link information in hypertext data, which have been displayed, are designated by the designating unit, information showing a location of the displayed hypertext data including the informing data designated by the designating unit is acquired by the first information acquiring unit and the link information specified by the informing data designated by the designating unit is also acquired by the second information acquiring unit. The first and second information processing devices each may be plural. In addition, when a function as (or of) the second informa-

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tion processing device is provided to the first information processing device, while a function as the first information device is provided to the second information device, information pieces relating to hypertext data may be transmitted to the first information processing device from the second information device. Furthermore, three or more information processing devices may be used and information pieces relating to hypertext data can mutually be transmitted and received among them.

[0028] Here, the location information and the link information of the hypertext data respectively acquired by the first and the second information acquiring unit are desirably stored in the storage unit in a related manner, for example as a table. In this case, the location information and the link information of the hypertext respectively acquired by the first and the second information acquiring unit, and stored in the storage unit are, if necessary, transmitted to the second information processing device through the transmitting unit.

[0029] The second information processing device is, for example, a computer of a desk top type. Location information and link information of hypertext data acquired by a portable information terminal as the first information processing device are received by the receiving unit and, not only is the hypertext data acquired from the location but the hypertext data which has been indicated by the link information is acquired by the data acquiring unit according to the received information.

[0030] Here, the second information processing device is desirably provided with a storage unit in which the location information and the link information of the hypertext data received by the receiving unit are stored in a related manner. In the second information processing device, the data acquiring unit acquires the hypertext data from a location according to the location information and the hypertext data indicated by link information.

[0031] A second aspect of a display device according to the present invention for displaying hypertext data including link information indicating an existence of a link to other data, comprises: a designating unit for designating informing data corresponding to specific link information for the other data to be acquired from among informing data showing the presence of link information in the hypertext data displayed on a display; a judging unit for judging whether the other data should be acquired based on the link information designated by the designating unit; and a controlling unit for acquiring the other data according to the designated link information when it is judged that the other data should be acquired, and for storing the designated link information in a designated information storage unit when it is judged that the other data should not be acquired.

[0032] In other words, with a hypertext display device of the present aspect in use, according to contents of the link information, the other data is acquired promptly or only the link information is stored in the designated information storage unit instead of acquiring the other data. Therefore, for example, when hypertext is displayed in the off-line state, only hypertext data stored on a local disk are immediately acquired, while the link information for hypertext data present on a network is stored. And later when the display device is connected with the network, the hypertext data is acquired according to the stored link information, and the hypertext data can be efficiently displayed.

[0033] A display device of the second aspect may further comprise a specific information storage unit for storing specific link information, wherein the judging unit judges that the other data should be acquired when the designated link information agrees with the specific link information stored in the specific information storage unit, and judges that the other data should not be acquired when the designated link information does not agree with the specific link information.

[0034] A display device of the second aspect may further comprise a data storing unit for storing the other data, wherein the specific link information stored in the specific information storage unit is link information telling an user about a link to the other data stored in the data storage unit.

[0035] A display device of the second aspect may further comprise: an event generating unit for generating an event at an appointed time; and a data acquiring unit for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event generating unit generate the event.

[0036] A display device of the second aspect may further comprise; a communication unit to connect with a network;an event generating unit for generating an event on condition that the communication unit has connected with the network; and a data acquiring unit for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event generating unit generates the event.

[0037] A display device of the second aspect may further comprise: an event detecting unit for detecting an appointed event; and a data acquiring unit for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event detecting unit detects the event.

[0038] A third aspect of a display device according to the present invention for displaying hypertext data including link information indicating an existence of a link to other data, comprises: a specific information storage unit for storing first specific link information and second specific link information; a designating unit for designating informing data corresponding to the link information for the other data to be acquired from among informing data showing the presence of link information in the hypertext data displayed on a display; a selecting unit for selecting either the first specific link information or the second specific information stored in

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the specific information storage unit; a judging unit for judging whether the link information designated by the designating unit agrees with the specific link information selected by the selecting unit; and a controlling unit for acquiring the other data according to the designated link information when it is judged that the designated link information agrees with the selected specific link information, and for storing the designated link information in a designated information storage unit when it is judged that the designated link information does not agree with the selected specific link information.

[0039] A display device of the third aspect may further comprise a data storing unit for storing the other data, wherein the first specific link information is link information indicating an existence of a link to the other data stored in the data storing unit and the second specific link information is link information indicating an existence of a link to the other data present on a network.

[0040] A display device of the third aspect may further comprise: a event generating unit for generating an event at an appointed time; and a data acquiring unit for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event generating unit generates the event.

[0041] A display device of the third aspect may further comprise: a communication unit to connect with a network; an event generating unit for generating an event on condition that the communication unit has connected with the network; and a data acquiring unit for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event generating unit generates the event.

[0042] A display device of the third aspect may further comprise: an event detecting unit for detecting an appointed event; and a data acquiring unit for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event detecting unit detects the event.

[0043] A second aspect of a method for displaying hypertext data according to the present invention,i.e. a method for displaying hypertext data including link information indicating an existence of a link to other data, comprises: a step of designating informing data corresponding to the link information for the other data to be acquired from among informing data showing the presence of link information in the hypertext data displayed on a display; a step of judging whether the other data should be acquired based on the designated link information; and a step of acquiring the other data according to the designated link information when it is judged that the other data should be acquired, and of storing the designated link information in designated information storage means when it is judged that the other data should not be acquired.

[0044] The means for realizing the above described functions can be achieved on a computer with use of a program and the program can be recorded on a storage medium such as CD-ROM, and distributed.

[0045] A detailed description will now be given, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a block diagram illustrating a principle of a first embodiment of the present invention;
FIG. 2 is a detailed block diagram illustrating the first embodiment of the present invention;
FIG. 3 is a diagram showing an example of a table 8;
FIG. 4 is a diagram showing a modified example of data structure of the table 8;
FIG. 5 is a flow chart showing procedures of the first embodiment of the present invention;
FIG. 6 is a block diagram showing a second embodiment of the present invention;
FIG. 7 is a block diagram showing a third embodiment of the present invention;
FIG. 8 is a block diagram showing a fourth embodiment of the present invention;
FIG. 9 is a block diagram showing a fifth embodiment of the present invention;
FIG. 10 is a block diagram showing a sixth embodiment of the present invention;
FIG. 11 is a flow chart showing procedures of the sixth embodiment of the present invention;
FIG. 12 is a block diagram showing a construction of a seventh embodiment of the present invention;
FIG. 13 is a block diagram showing a construction of a eighth embodiment of the present invention; and
FIG. 14 is a view showing a window for selecting a table in the eighth embodiment of the present invention.

[0046] Below, described will be embodiments of the present invention.

〈First Embodiment〉

[0047] FIG. 1 is a block diagram illustrating a principle of a display device for displaying hypertext according to a first embodiment of the present invention. The display device of the first embodiment is applied to a browser for display hypertext information on a computer. In the first embodiment, the computer is connected to the Internet (data transport network according to TCP/IP: Transmission Control Protocol / Internet Protocol) through a network, and acquires documents and the like as hypertext information stored in a server on WWW (World Wide Web).

[0048] In other words, the hypertext display device in the present embodiment is a device to display hypertext data including link information to indicate the data to which the hypertext data are linked. Here the hypertext data which are handled here are a file which is described in HTML (Hypertext Markup Language) and

BNSDOCID: <EP_____0977133A2_I_>

consists of text data, layout information and hyper link information to be displayed on a display device.

[0049] Hereinafter, a principle of the present invention is described referring to FIG. 1. The display device of the present invention comprises: an HTML display control section (4); a user interface (5); a first information acquiring section (6); a second information acquiring section (7); a data acquiring section (9); and a data storage (16).

[0050] The HTML display control section (4) acquires hypertext data stored in a server on the Internet and displays a content of the acquired HTML data on a display. HTML data acquired from a server on the Internet are displayed in a window (1) of the display. The HTML data include informing data, for example a bit map (figure) such as an icon (3), and a text (2) attached with an underline. The informing data is a contrivance for informing a user that the displayed HTML data links to other HTML data. The user interface (5) as designating means designates a URL (Uniform Resource Locator) which is a location of a linked side HTML data on the Internet by designating informing data (figure (3) and text (2)) on the display.

[0051] When informing data is designated by the user interface (5), the first information acquiring section (6) acquires information showing a location (URL) of HTML data themselves displayed on the display device, the HTML data include the designated informing data. At the same time, the second information acquiring section (7) acquires link information, namely, the URL of the linked side HTML data specified by the informing data designated by the user interface (5). Data acquired by the first information acquiring section (6) and the second information acquiring section (7) are stored in a table (8) as storage means in a pair for each combination of identification data.

[0052] According to an instruction from a user, the data acquiring section (9) acquires the HTML data themselves in which informing data is described and the HTML data indicated in the link information corresponding to the informing data sequentially referring to the table (8). The acquired HTML data, that is, the linked side HTML data and the linking side HTML, are stored by the data storage (16).

[0053] FIG. 2 is a block diagram showing a construction of the display device of the first embodiment. FIG. 3 is a diagram showing a concrete structure of the table (8) of the present embodiment. Details of the hypertext display device of the present embodiment will be described referring to FIGs. 2 and 3.

[0054] In the first embodiment, the display device is realized by software (a browser) on a personal computer. The software interprets HTML data and displays a window (1) including data such as a text, an image and a figure on a display of a personal computer. Part of the text on the window (1) is informing data in which link information for other HTML data is embedded and shown in FIG. 2, with emphasis by an underline (hereinafter, this informing data is referred to as link text (2)). Part of a image data is an icon (3) shown in a bit map in which link information for still another HTML data is included.

[0055] Here, a concrete description on a link of HTML data in the present embodiment will be given. As described above, informing data informing a user of the presence of linked information in HTML data are an icon (3), a figure and a photograph shown in a bit map, or a link text (2) marked with a color or an underline. These informing data are related by a tag for a hypertext link. Generally, the hypertext related tag in HTML is indicated by ⟨A⟩ and called "anchor".

[0056] The anchor tag is started with "⟨A", designates a document name (file name) of a hyper-linked side with a parameter ⌈HREF = "filename"⌋ and closed with a mark "⟩". Subsequently, a file name of HTML data (linking side HTML data) to be displayed on the window (1) is input. Thereafter, the anchor tag is finally completed with "⟨/A⟩".

For example, in entry of ⟨A HREF = "MaineStates.html"⟩ Maine ⟨/A⟩, a hyper link to a document "MaineStates.html" is prepared in a linking side HTML data file "Maine". At this point, the MaineStates.html file is required to be placed in the same directory as the "Maine" file. When the linked side file is placed on a different directory from the linking side HTML data file, the directory can be designated with a relative path from the linking side document file. For example, when a document of a file "NJStates.html" is placed in a sub-directory "AtlanticStates", the anchor tag is described as follows:

⟨A HREF = "AtlanticStates/NJStates.html"⟩ NJStates ⟨/A⟩

[0057] The directory can be designated with an absolute path instead of a relative path and in this case, a method for designating the absolute path depends on the type of WWW server in use.

[0058] Furthermore, in WWW, a location of HTML data stored in another WWW server can be designated in a standard manner using expressions called Uniform Resource Locators (URLs). URLs include a type of resource and can perform an access to resources other than WWW (for example, Gopher, WAIS and FTP). The syntax of a URL will be shown as follows:

scheme: //host.domain[:port]/path/filename,
where a scheme is one of the group consisting of:
file: a file on a local system or Anonymous FTP
ftp: a file on Anonymous FTP
http: a file on a WWW server
gopher: a file on a Gopher server
WAIS: a file on a WAIS server
news: news group
telnet: connection to a host by TELNET

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[0059] For example, an anchor tag to link a document file to an HTML file on another WWW server is designated as follows:

〈A HREF = "http://www.ncsa.uiuc.edu/General-maru/ Internet/WWW/HTMLPrimer.html"〉 NCSA's Beginner's Guide to HTML 〈/A〉

[0060] The above is a description of concrete link information (informing data). A two-button mouse (5A) and a keyboard (5B) are connected to the personal computer as a designating unit (user interface) for designating link information such as the link text (2) and the icon (3) displayed on the window (1) and any point on the window (1) can be clicked by a mouse cursor which moves as in an interlocking manner with the mouse (5A).

[0061] The first information acquiring section (6) for acquiring information showing a location (URL) of the HTML data themselves currently being displayed, and the second information acquiring section (7) for acquiring link information of informing data designated by the mouse (5A) and the keyboard (5B) are both realized by software. In the display device of the present embodiment, in a similar manner to a general display device, when the user moves a mouse cursor onto the link text (2) or the icon (3) on the window (1) and performs a left-click of the mouse buttons, the linked side HTML data can be acquired by the data acquiring section (9) and the linked side HTML data is displayed on the window (1).

[0062] In the present embodiment, in addition to such common functions, operations which will be described can be performed. For example, when the mouse (5A) is left-clicked on the link text (2) while pushing down the ALT key on the keyboard link information embedded in the link text (2) is taken into the table (8). The table (8) is stored in storage means such as a memory.

[0063] As shown in FIG. 3, in the table (8) for storing link information designated by a user, the URL of the HTML data currently being displayed, that is, a linking side URL, and the URL of HTML data which are designated by the informing data, that is, a linked side URL, are in one to one correspondence stored for each combination of informing data. When such operations are properly performed while moving over various sites on WWW, each item of link information is accumulated in the table (8).

[0064] When the user requests to acquire the linked side HTML data, a data acquiring section (9) acquires HTML data stored in each server according to link information accumulated in the table (8). The data acquiring section (9) is realized by software. When a command for acquiring the linked side HTML file is included in a menu loaded on the display device, a user selects the command from among the menu as needed. Then, the data acquiring section (9) acquires link information 1, 2, 3, • • •, n from the table (8) and the linked side HTML files indicated by the link information are downloaded from a related site through communication means.

[0065] FIG. 5 is a flow chart showing procedures of the present embodiment. Hereinafter, a method for displaying hypertext of the present embodiment will be described as follows, referring to FIG. 5. A user starts a browser installed in a personal computer and thereafter, acquires HTML (hypertext) data from a server on the Internet (step 101). The acquired HTML data is stored in the data storage (16). The HTML data is interpreted by the HTML display control section (4) and displayed on the display of the personal computer (step 102). Thereafter, the user designates informing data (the link text (2) or the icon (3)) in the HTML data currently being displayed by left-click of the mouse (5A) on the informing data while pushing down the ALT key on the keyboard (5B) (step 103).

[0066] By the first information acquiring section (6), information showing a location such as a URL of the HTML data currently being displayed, that is, a linking side address is acquired (step 104). Also, link information which is specified by informing data which the user has designated (a linked side address) is acquired (step 105).

[0067] Both items of link information acquired at steps 104 and 105 are stored in the table (8) in a storage in a corresponding manner with each other (step 106). In this way, the link information on linked side HTML data can be held in the table (8), which is not required to be displayed at the present time but required to be accessed later.

[0068] When linked, side HTML data is displayed on the display according to the link information held in the table (8), at step 107, the HTML display control section (4) reads both the linking side address and the linked side address which are related with each other from the table (8). Then, the data acquiring section (9) acquires the linking side HTML data referring to the linking side address (step 108). Thereafter, the data acquiring section (9) acquires the linked side HTML data referring to the linked side address (step 109), and the HTML display control section (4) displays the acquired linked side HTML data on the display.

[0069] In such a way, in the present embodiment, the linking side address and the linked side address of the HTML data which have been designated by a user are held in the table (8) in a corresponding manner with each other, and when a user requires, necessary HTML data can be acquired according to link information held in the table (8) and displayed. Thereby, it can easily store the link information for HTML data which is not necessary to be acquired immediately but is required to be acquired later, and it can easily access the HTML data. When HTML data is displayed in the off-line state, link information designated by a user is held in the table (8) and when connection with the Internet is established, the designated HTML data can be acquired with ease. Accordingly, operations to acquire HTML data on

BNSDOCID: <EP_____0977133A2_I_>

WWW becomes easier and the number of operations going or returning over various sites while tracing link information is decreased. Hence, time of connection waiting and communication cost are reduced.

[0070] In the present embodiment, a mouse is left-clicked while the ALT key on the keyboard is pushed down for storing informing data (link information) designated by a user in the table (8); however, a right-click or another method can be applied.

[0071] In the table (8) shown in FIG. 3, only one linked side URL is stored for one linking side. But there are, actually, many cases where a plurality of HTML data are linked to one linking side. Therefore, in order to save memory, a data structure as shown in FIG. 4 may be adopted as another example. The left column of the table is a flag area and when a flag of "linking side" is attached therein, a corresponding URL in the right column indicates a linking side URL. When no flag of "linking side" is attached in the flag area, a corresponding URL in the right column indicates a linked side URL.

〈Second Embodiment〉

[0072] FIG. 6 is a block diagram showing a construction of a display device for displaying hypertext of a second embodiment of the present invention. The display device of the second embodiment has a feature that the device further comprises a timer (10) which generates an event at a time appointed by a user, but the other constituents are same as the first embodiment.

[0073] In other words, a display device of the present embodiment, as in the first embodiment, comprises: the HTML display control section (4) in which HTML data (hypertext) acquired from a server on the Internet is interpreted and displayed on the display; the user interface (5) (a designating unit) such as the mouse and the keyboard which a user uses for designating informing data (the link text (2) and the icon (3)) showing a link in HTML data in display; the first and second information acquiring sections (6), (7) for acquiring a linking side address and a linked side address from informing data designated by the user interface (5); and the table (8) for storing link information acquired from the information acquiring means (6), (7) in a corresponding manner with each other. The hypertext display device of the present embodiment further comprises a timer (10) which generates an event at a tine which a user appoints. In the present embodiment, a data acquiring section (11) acquires not only designated HTML data according to a user request as in the first embodiment but designated HTML data on receiving generation of an event by the timer (10).

[0074] With such a construction in use, for example, link information on data which is not necessary to be acquired immediately at the present time but becomes necessary to be read later is stored in the table (8), and designated HTML data can automatically be acquired from each server according to information of the table (8) on time which is appointed by the timer (10). Thereby, since while a user is engaged in another work, necessary HTML data can be acquired when the event is generated by the timer (10), the user can save time and is imposed with less trouble for acquiring HTML data.

〈Third Embodiment〉

[0075] FIG. 7 is a block diagram showing a construction of a display device for displaying hypertext of a third embodiment of the present invention. The display device of the third embodiment has a feature that the device further comprises an event generating section (12) for generating an event on condition that the hypertext display device is connected with a network and the other constituents are same as the first embodiment. In other words, when a display device of the present embodiment is connected to a network, the event generating section (12) detects the connection and generates an event to acquire the HTML data. Then, a data acquiring section (13) detects the generation of the event and sequentially acquires the designated HTML data according to the link information stored in the table (8).

[0076] With such a construction in use, for example, when HTML data has been displayed in the off-line state, a linked side HTML data designated by the user can be automatically acquired when the hypertext display device is connected with a network.

〈Fourth Embodiment〉

[0077] FIG. 8 is a block diagram showing a construction of a display device for displaying hypertext of a fourth embodiment of the present invention. The fourth embodiment has a feature that the device further comprises an event detecting section (14) for detecting an event when the event has been generated and the other constituents are same as in the first embodiment. An event detected by the event detecting section (14) may be, for example, a users request to close a software.

[0078] As described above, in the embodiments of the present invention, the hypertext display device is realized on a personal computer on which a software is loaded. When the user has requested to close the software, the event detecting section (14) detects the request. Then, a data acquiring section (15) sequentially acquires designated HTML data according to the table (8) on reception of the event detection.

[0079] With such a construction in use, for example, when the user finishes use of the display device, the data acquiring means (15) acquires designated HTML data. That is, when HTML data, which is not necessary at the present time for a user but becomes necessary to be read later, is designated, the designated HTML data is automatically acquired and stored in the data storage (16) after the software is closed. Therefore, the user

BNSDOCID: <EP_____0977133A2_I_>

does not have to request acquisition of the HTML data later, and can read the HTML data any time.

〈 Fifth Embodiment〉

[0080] FIG. 9 is a diagram showing a construction of a display device for displaying hypertext according to a fifth embodiment of the present invention. The present embodiment has a feature that the device further comprises a transfer section (17) for transferring link information stored in the table (8) provided for the display devices of the above described embodiments to another information processing device.

[0081] In other words, in the above described embodiments, the link information stored in the table (8), in which the linking side address and a linked side address of HTML data designated by a user are stored in a corresponding manner with each other, is read by the transfer section (17) and transferred to another information processing device (20). Then, in the information processing device (20), each item of link information stored in the table (8) is referred to and necessary HTML data are acquired.

[0082] In such a way, in the present embodiment, since a table (8) in which link information is stored can be transferred to another information processing device, necessary HTML data can acquired at another information processing device without any repetition of the same operation thereon.

〈 Sixth Embodiment〉

[0083] FIG. 10 is a block diagram showing a construction of a display device for displaying hypertext according to a sixth embodiment of the present invention, and FIG. 11 is a flow chart showing procedures of the sixth embodiment. In the present embodiment, there is shown a concrete example in which the transfer section (17) described in the fifth embodiment is provided in the display device of the first embodiment.

[0084] The display device of the present embodiment is realized by execution by a CPU (not shown) of a program stored on a hard disk (23) of a desktop PC (21). The desktop PC (21) is connected to the Internet (22) as a network through a modem (modulator / demodulator) and a telephone line (both the modem and the telephone line are not shown in the figure). A portable type terminal (a hand held computer, hereinafter referred to as "H/PC") (24), is also a display device which is realized when the CPU runs a program stored on the hard disk.

[0085] The desktop PC (21) acquires HTML data from WWW and the data is downloaded on the hard disk (23). The desktop PC (21) and H/PC (24) are connected to each other by a serial interface (transfer means) (26). With the connection, data which are respectively stored on their hard disks can mutually be transferred. Besides, H/PC (24) can singly be used in connection to the Internet as well.

[0086] Hereinafter, procedures for displaying hypertext data of the present embodiment using a plurality of display devices will be described, in reference to FIGs. 2, 9, 10. First of all, a user starts a browser for displaying HTML data using a H/PC (24) and acquires HTML data (hypertext data) from a server on the Internet (step 201). The acquired HTML data is interpreted and displayed on the display of the H/PC (24) (step 202). At this point, since HTML data is displayed in a simplified format, image data and the like are not displayed. A user reads a displayed HTML data and designates necessary informing data (step 203). Then, information (a linking side address) showing a location of the HTML data currently being displayed is acquired (step 204). Besides, link information (a linked side address) specified by informing data is acquired (step 205). The linked side address and the linking side address are transmitted to the desktop PC (21) through the serial interface (26) while keeping a corresponding relation with each other (step 206). By such procedures, the link information of the designated HTML data including data which cannot be displayed on the portable type terminal (H/PC (24)) can be transferred from H/PC (24) to the desktop PC (21) which can display all the data.

[0087] On the other hand, the desktop PC (21) acquires the link information which has been transmitted from the H/PC (24) (step 207). Then, according to the acquired link information, HTML data existing in a linking side address is acquired by the data acquiring section (9) (step 208). Then, HTML data existing in a linked side address is acquired and both HTML data are displayed on the display of the desktop PC (step 209).

[0088] When a user accesses the Internet outside his home or office using a H/PC (24) loaded with a browser which displays web pages in a simplified manner, the user may find that HTML data can be displayed on H/PC (24), whereas there is still left some information not displayed. When the user desires to read the information not displayed even in this situation, the information including the address of the HTML data is transmitted to another information processing device such as a desktop PC (21) through a serial interface and thereafter, all the information can be displayed using a browser which can display HTML data in normal manner. Accordingly, the same operation as operated in the H/PC (24) is not repeated in the desktop PC (21) and HTML data which the user desires to read can be displayed on the desktop PC (21).

[0089] When a display device of the present embodiment is employed, a method as described below will also be able to be used. First of all, HTML data on WWW are acquired by a desktop PC (21) and the HTML data are transferred to an H/PC (24). The transferred HTML data are interpreted and displayed on the H/PC (24) in the off-line state where connection with the Internet is not established. While the HTML data is being displayed on the H/PC (24), a user designates informing

BNSDOCID: <EP 0977133A2_I_>

data including link information which the user desires to read later. The link information designated by the user is accumulated in the H/PC (24). And when the H/PC (24) is again connected with the desktop PC (21), the link information is transferred to the desktop PC (21). Thereby, the HTML data which have not been able to be read on the H/PC (24) are acquired by the desktop PC (21) and displayed thereon.

〈Seventh Embodiment〉

[0090] FIG. 12 is a block diagram showing a construction of a display device for displaying hypertext of a seventh embodiment of the present invention. The display device of the seventh embodiment comprises: a hypertext display control section (34), a first storage (35); a second storage (37); a judging section (36); an user interface (38); and a data storage (39).

[0091] The hypertext display control section (34) acquires HTML data from a server on a network, interprets the acquired HTML data and displays the data on the display. As in the above described embodiments, the displayed HTML data includes informing data such as a link text (2) and an icon (3) showing a link to another HTML data. The user interface (38) designates the informing data in the HTML data displayed on the display by the hypertext display control section (34). The acquired HTML data are held in the data storage (39) such as a hard disk.

[0092] The first storage (35) stores a specific link information (a linking side URL and a linked side URL) which is predetermined by a user. The first storage (35) of the present embodiment has a table (35A) in which linking side addresses and a linked side address on a local disk of HTML files, which are downloaded from WWW for predetermined numbers of hierarchy and held in the data storage (39), are stored in a corresponding manner. The table (35A) has a structure as shown in FIG. 3 or 4 in a similar way to the tables (8) of the above described embodiments.

[0093] The judging section (36) compares link information in informing data designated by a user with link information stored in the table (35A) of the first storage section (35) and determines whether linked side HTML data should be displayed immediately or later. That is, the judging section (36) compares whether the link information designated by the user agrees with the link information stored in the table (35A). When a linked side address of designated HTML data agrees with that registered in the table (35A), the hypertext display control section (34) acquires corresponding HTML data from the data storage (39) and displays the HTML data.

[0094] When a linked side address in link information designated by a user does not agree with that registered in the table (35A), both an address of the server which stores the HTML data currently being displayed and the linked side address in designated link information are stored in the second storage (37) in a corresponding manner. In the cases when a user requested or when connection is established with the Internet, the HTML data designated by the user are acquired based on link information stored in the second storage section (38).

[0095] A display method for hypertext data according to the present embodiment will be described as follows. A display device of the present embodiment is realized by execution by a CPU of a program stored on a hard disk of a personal computer as in the above-described first embodiment.

[0096] There are already available some programs in each of which HTML files on WWW are automatically downloaded for predetermined numbers of hierarchy (no. of links). Such programs store the downloaded HTML data in a local auxiliary storage device such as a hard disk and mutual link information is rewritten into local values to assign a new link relation. With such procedures, mutual links between the HTML data are all confined within a closed space in a local environment. Therefore, time for acquiring the HTML data in network access is shortened and high speed operation for displaying HTML data can be realized.

[0097] HTML data acquired by such a program are stored in the data storage (39) of the display device. Link information of each item of HTML data, rewritten into local values, is registered in the table (35A) of the first storage (35).

[0098] The user reads HTML data, which is displayed on the display by the HTML display control section (34) after being acquired by the program, in the off-line state where connection with a network is not established. Thereafter, the user designates informing data (a link text (2) or an icon (3)) showing a link to the other HTML data which the user desires to acquire by a user interface (38) such as the mouse or the keyboard.

[0099] The judging section (36) compares the designated link information including a linking side address and a linked side address with link information registered in the table (35A). When the linked side address designated by the user agrees with one piece of the link information registered in the table (35A), that is, when designated HTML data is already stored in the data storage (39) by being acquired by the program to automatically download HTML data, the HTML data is acquired from the data storage according to the linked side address by the HTML display control section (34) and displayed on the display thereof.

[0100] When it is determined that a linked side URL of HTML data designated by a user does not agree with one registered in the table (35A), that is, when the URL of HTML data designated by the user is still on the Internet, link information including a linking side address and a linked side address thereof are stored in the second storage (37) in a related state with each other. At this point, since the hypertext display device is in the off-line state, the HTML data designated by a user cannot be acquired. Thereafter, when the display device is con-

BNSDOCID: <EP_____0977133A2_I_>

nected with the Internet, HTML data designated by the user is acquired based on the link information stored in the second storage (37).

[0101] In such a way, a display device of the present embodiment determines whether or not linked side HTML data designated by a user are stored on a local disk (the data storage (39)) when the user reads an Internet in the off-line state. When the designated HTML data are stored in the data storage (39), the HTML data is immediately acquired and displayed. But when the HTML data are not stored in the data storage (39), the link information is temporarily stored in the second storage section (37) and the HTML data is later acquired from WWW. In other words, though the user side does not determine whether desired HTML data are stored in the data storage (39) or the desired HTML data have to be acquired from a server on the Internet, the determining section (36) determines it instead and therefore time and efforts on the user side can be reduced. Besides, when a user reads HTML in the off-line state, a waste of connection cost or time due to useless access to a network can be prevented from occurring.

(Eighth Embodiment)

[0102] FIG. 13 is a block diagram showing a construction of a display device for displaying hypertext according to an eighth embodiment of the present invention. The eighth embodiment has a feature that the device has two tables in the first storage and the other constituents are same as in the seventh embodiment.

[0103] In the first storage (45), tables (45A), (45B) holding link information of HTML data are stored. The table (45A) stores an URL of HTML data stored in the data storage (39) which have already downloaded, as in the table (35A) of the seventh embodiment. The other table (45B) stores URL's of HTML data which the hypertext display device can access at speed, such as HTML data stored in a server on a LAN of a office. The user interface (48) not only designates informing data on HTML data displayed on the display but selects which of the tables (45A), (45B) should be effective for the judging section (36) to determine the time when the HTML data is acquired.

[0104] FIG. 14 is a diagram showing an example of a window for selecting a table by the user interface (48). As shown in the figure, when a command "Options" is selected from a menu on the window of the display, a window to select it which of the table (45A) or the table (45B) is effective is displayed. A user designates one of the tables from the window with the user interface (48) such as the mouse. The table (45A) is selected in the FIG. 14.

[0105] A method for displaying hypertext data according to the present embodiment is described as follows. First of all, a user selects the table (45B) in which URL's of HTML data stored in a server on the office LAN are registered and reads HTML data displayed on the display in the state where the display device is connected to the office LAN. Then the user designates informing data showing a link to other HTML data which the user desires to acquire, with the user interface (48).

[0106] The judging section (36) compares a linked side URL shown by the informing data designated by the user with a URL stored in the selected table (45B). When the address designated by the user agrees with the address stored in the table (45B), that is, in the case where the linked side HTML data can be acquired at speed since the HTML data designated by a user is stored in a server on the office LAN, the designated HTML data are immediately acquired and displayed. On the other hand, when the designated linked side address is not stored in the table (45B), the linked side address is stored in the second storage (37) in a corresponding manner to the linking side URL. At this point, the designated HTML data is not displayed and later acquired on demand by the user.

[0107] When the display device is a note book type PC in the state where the PC is not connected to a network such as a LAN, a user selects the table (45A) in which the URL of HTML data stored in the data storage (39) is registered and reads displayed HTML data. In this case, as in the case of the seventh embodiment, only when HTML data designated by the user is stored in the data storage (39), the HTML data is immediately acquired and in the other cases, the linked side URL is stored in the second storage (37) and later when connection with a network is established, the HTML data is acquired.

[0108] In such a way, in the present embodiment, since a table can be selected for judgment on when the designated HTML data should be acquired according to a use environment of a display device, acquisition and display of HTML data can efficiently be performed.

[0109] This invention being thus described, it will be obvious that the same may be varied in various ways. Such variations are not to be regarded as departure from the scope of the invention, and all such modifications would be obvious for one skilled in the art intended to be included within the scope of the following claims.

Claims

1. A display device for displaying hypertext data including link information indicating an existence of a link to other data, comprising:

   a designating unit (5) for designating informing data corresponding to the link information for the other data to be acquired from among informing data showing the presence of link information in the hypertext data displayed on a display;

   a first information acquiring unit (6) for acquiring information showing a location of the displayed hypertext data including the informing

BNSDOCID: <EP_____0977133A2_I_>

data designated by the designating unit (5);

a second information acquiring unit (7) for acquiring the link information specified by the informing data designated by the designating unit (5);

a storage unit for storing the location information acquired by the first information acquiring unit (6) and the link information acquired by the second information acquiring unit (7) for correspondence to each other; and

a data acquiring unit (9) for acquiring the hypertext data from the location according to the location information and the other data indicated by the link information, both the location information and the link information being stored in the storage unit.

2. A display device according to claim 1, further comprising:

a data storage unit (16) for storing the hypertext data and the other data acquired by the data acquiring unit.

3. A display device according to claim 1 or 2, further comprising:

an event generating unit (10) for generating an event at an appointed time,

wherein the data acquiring unit (9) acquires the hypertext data from the location according to the location information and the other data indicated by the link information when the event generating unit (10) generates the event.

4. A display device according to claim 1, 2 or 3, further comprising:

a communication unit to connect with a network; and

an event generating unit (12) for generating an event on condition that the communication unit has connected to the network,

wherein when the event is generated by the event generating unit, the data acquiring unit (9) acquires the hypertext data from the location according to the location information and the other data indicated by the link information.

5. A display device according to any preceding claim, further comprising:

an event detecting unit (14) for detecting an appointed event,

wherein when the event detecting unit (14) detects the event, the data acquiring unit (9) acquires the hypertext data from the location according to the location information and the other data indicated by the link information.

6. A method for displaying hypertext data including link information indicating an existence of a link to other data, comprising:

a step of designating informing data corresponding to the link information for the other data to be acquired from among informing data which show the presence of link information in the hypertext data displayed on a display;

a step of acquiring information which shows a location of the displayed hypertext data including the designated informing data;

a step of acquiring link information specified by the designated informing data;

a step of storing the acquired location information and the acquired link information of the hypertext data for correspondence to each other; and

a step of acquiring the hypertext data from the location according to the stored location information and the other data indicated by the stored link information.

7. A display system which consists of at least two information processing devices constituting a display device for displaying hypertext data including link information indicating an existence of a link to the other data,

a first information processing device comprising:

a designating unit (5) for designating informing data corresponding to the link information for the other data to be acquired from among informing data showing the presence of link information in hypertext data displayed on a display;

a first information acquiring unit (6) for acquiring information showing a location of the displayed hypertext data including the informing data designated by the designating unit (5);

a second information acquiring unit (7) for acquiring the link information specified by the informing data designated by the designating unit (5); and

a transmitting unit for transmitting the location information acquired by the first information acquiring unit (6) and the link information of the hypertext data acquired by the second information acquiring unit (7) to a second information processing device, and

the second information processing device comprising:

a receiving unit for receiving the location information and the link information of the hypertext data which have been transmitted from the first

BNSDOCID: <EP... ____ 0977133A2_I_>

information processing device; and

a data acquiring unit (9) for acquiring the hypertext data from the location according to the received location information and the other data indicated by the link information according to the received link information.

8. A display system according to claim 7, wherein the first information processing device further comprises:

a storage unit for storing the location information acquired by the first information acquiring unit and the link information acquired by the second information acquiring unit for correspondence to each other,
wherein the transmitting unit transmits the location information and the link information of the hypertext data both stored in the storage unit to the second information processing device.

9. A display system according to claim 7 or 8, wherein the second information processing device further comprises:

a storage unit for storing the location information and the link information both received by the receiving unit for correspondence to each other,
wherein the data acquiring unit acquires the hypertext data from the location according to the location information and the other data indicated by the link information.

10. A storage medium for a computer on which a program for displaying hypertext data including link information indicating an existence of a link to other data is stored to execute:

a step of designating informing data corresponding to the link information for the other data to be acquired from among informing data which shows the presence of link information in the hypertext data displayed on a display;
a step of acquiring information which shows a location of the hypertext data displayed including the designated informing data;
a step of acquiring link information specified by the designated informing data;
a step of storing the acquired location information and the acquired link information of the hypertext data for correspondence to each other; and
a step of acquiring the hypertext data from a location according to the stored location information and the other data indicated by the stored link information.

11. A display device for displaying hypertext data including link information indicating an existence of a link to other data, comprising:

a designating unit (5) for designating informing data corresponding to the link information for the other data to be acquired from among informing data showing the presence of link information in the hypertext data displayed on a display;
a judging unit (36) for judging whether the other data should be acquired based on the link information designated by the designating unit; and
a controlling unit for acquiring the other data according to the designated link information when it is judged that the other data should be acquired, and for storing the designated link information in a designated information storage unit when it is judged that the other data should not be acquired.

12. A display device according to claim 11, further comprising:

a specific information storage unit (35) for storing specific link information,
wherein the judging unit (36) judges that the other data should be acquired when the designated link information agrees with the specific link information stored in the specific information storage unit (35), and judges that the other data should not be acquired when the designated link information does not agree with the specific link information.

13. A display device according to claim 12, further comprising:

a data storing unit (39) for storing the other data,
wherein the specific link information stored in the specific information storage unit (35) is link information indicating an existence of a link to the other data stored in the data storage unit (39).

14. A display device according to claim 11, 12, or 13, further comprising:

an event generating unit (10) for generating an event at an appointed time; and
a data acquiring unit (9) for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event generating unit generates the event.

15. A display device according to any of clams 11 to 14,

BNSDOCID: <EP_____0977133A2_I_>

further comprising:

a communication unit to connect with a network;
an event generating unit (12) for generating an event on condition that the communication unit has connected to the network; and
a data acquiring unit (9) for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event generating unit (12) generates the event.

16. A display device according to any of claims 11 to 15, further comprising:

an event detecting unit (14) for detecting an appointed event; and
a data acquiring unit (9) for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event detecting unit (14) detects the event.

17. A display device for displaying hypertext data including link information indicating an existence of a link to other data, comprising:

a specific information storage unit (35) for storing first specific link information and second specific link information;
a designating unit (5) for designating informing data corresponding to the link information for the other data to be acquired from among informing data showing the presence of link information in the hypertext data displayed on a display; a selecting unit for selecting either the first specific link information or the second specific information stored in the specific information storage unit;
a judging unit (36) for judging whether the link information designated by the designating unit agrees with the specific link information selected by the selecting unit; and
a controlling unit for acquiring the other data according to the designated link information when it is judged that the designated link information agrees with the selected specific link information, and for storing the designated link information in a designated information storage unit when it is judged that the designated link information does not agree with the selected specific link information.

18. A display device according to claim 17, further comprising:

a data storing unit for storing the other data,

wherein the first specific link information is link information indicating an existence of a link to the other data stored in the data storing unit and the second specific link information is link information indicating an existence of a link to the other data present on a network.

19. A display device according to claim 17 or 18, further comprising:

an event generating unit (10) for generating an event at an appointed time; and
a data acquiring unit (9) for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event generating unit (10) generates the event.

20. A display device according to claim 17, 18 or 19, further comprising:

a communication unit to connect with a network;
an event generating unit (12) for generating an event on condition that the communication unit has connected to the network; and
a data acquiring unit (9) for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event generating unit (12) generates the event.

21. A display device according to any of claims 17 to 20, further comprising:

an event detecting unit (14) for detecting an appointed event; and
a data acquiring unit (9) for acquiring the other data from the location according to the link information stored in the designated information storage unit when the event detecting unit detects the event.

22. A method for displaying hypertext data including link information indicating an existence of a link to appointed information, comprising:

a step of designating informing data corresponding to the link information for the other data to be acquired from among informing data showing the presence of link information in the hypertext data displayed on a display;
a step of judging whether the other data should be acquired based on the link information designated by the designating means; and
a step of acquiring the other data according to the designated link information when it is judged that the other data should be acquired,

BNSDOCID: <EP_____0977133A2_I_>

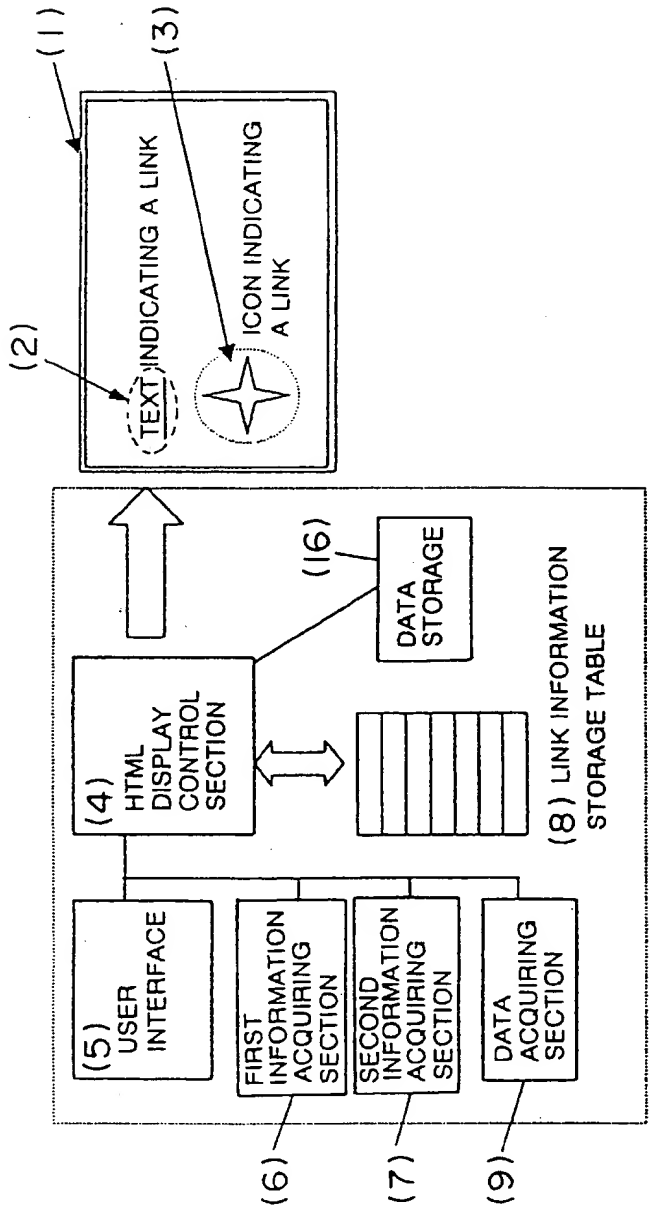
and of storing the designated link information in designated information storage means when it is judged that the other data should not be acquired.

23. A storage medium for a computer on which is stored a program for displaying hypertext data including link information from the hypertext data to other data to execute:

a step of designating informing data corresponding to the link information for the other data to be acquired from among informing data showing the presence of link information in the hypertext data displayed on a display;
a step of judging whether the other data should be acquired based on the link information designated by the designating means; and
a step of acquiring the other data according to the designated link information when it is judged that the other data should be acquired, and of storing the designated link information in designated information storage means when it is judged that the other data should not be acquired.

BNSDOCID <EP____ ... . 0977133A2_I_>

FIG. 1



BNSDOCID: <EP_____0977133A2_I_>

FIG. 2

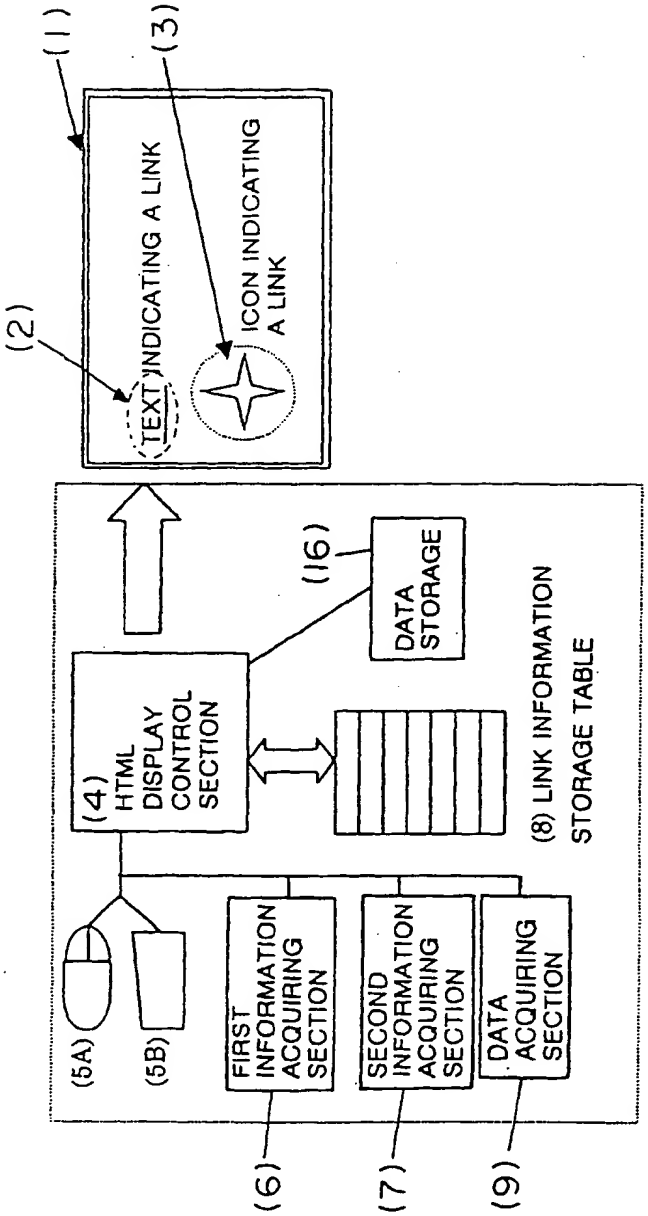


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FIG. 3

LINKING SIDE URL_1	LINKED SIDE URL_1
LINKING SIDE URL_2	LINKED SIDE URL_2
LINKING SIDE URL_3	LINKED SIDE URL_3
LINKING SIDE URL_n	LINKED SIDE URL_n

FIG. 4

"LINKING SIDE"	LINKING SIDE URL_1
	LINKED SIDE URL_{11}
	LINKED SIDE URL_{12}
	LINKED SIDE URL_{13}
"LINKING SIDE"	LINKING SIDE URL_2
	LINKED SIDE URL_{21}
	LINKED SIDE URL_{22}
"LINKING SIDE"	LINKING SIDE URL_3
	LINKED SIDE URL_{31}

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FIG. 5

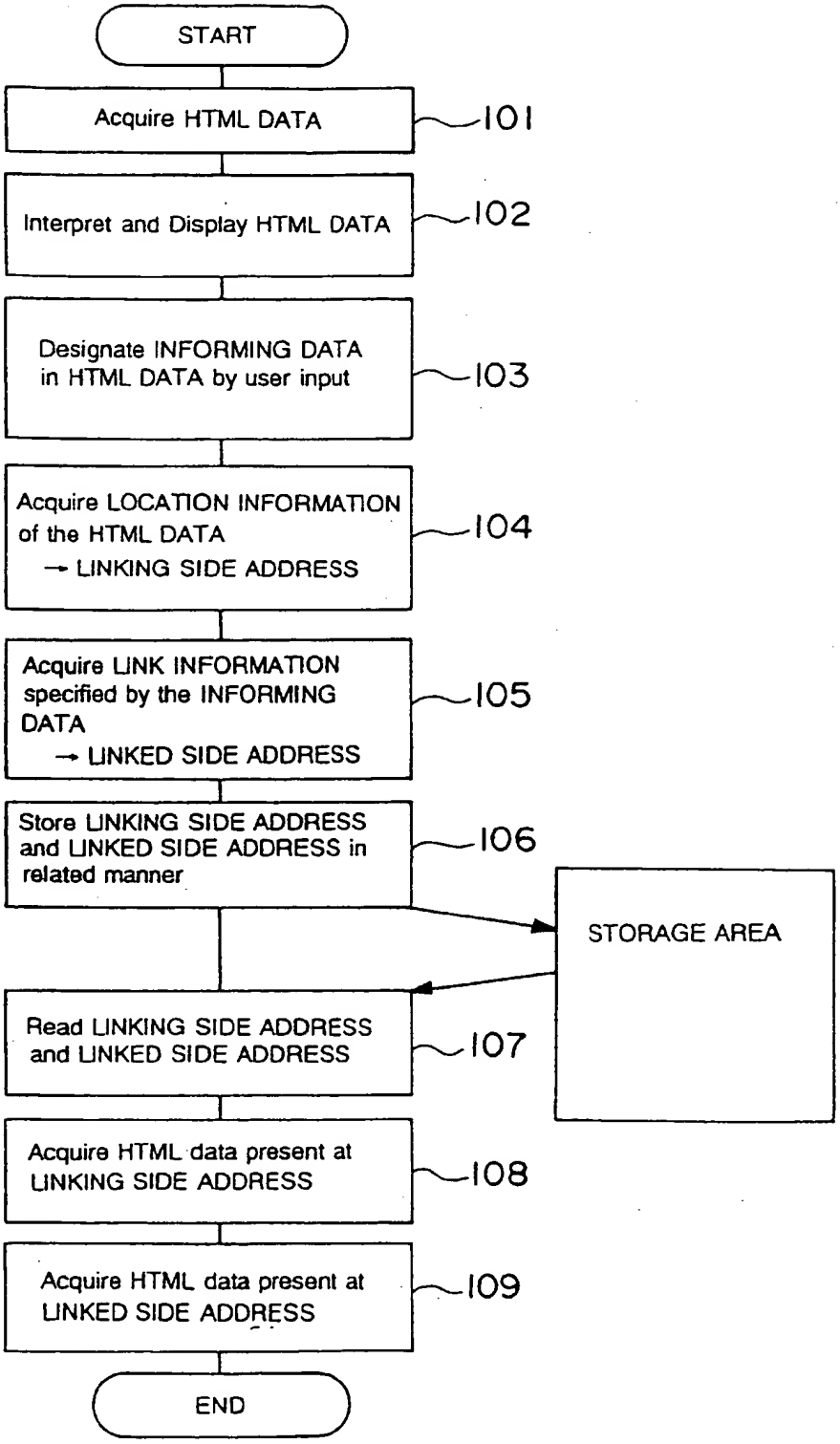

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FIG. 6

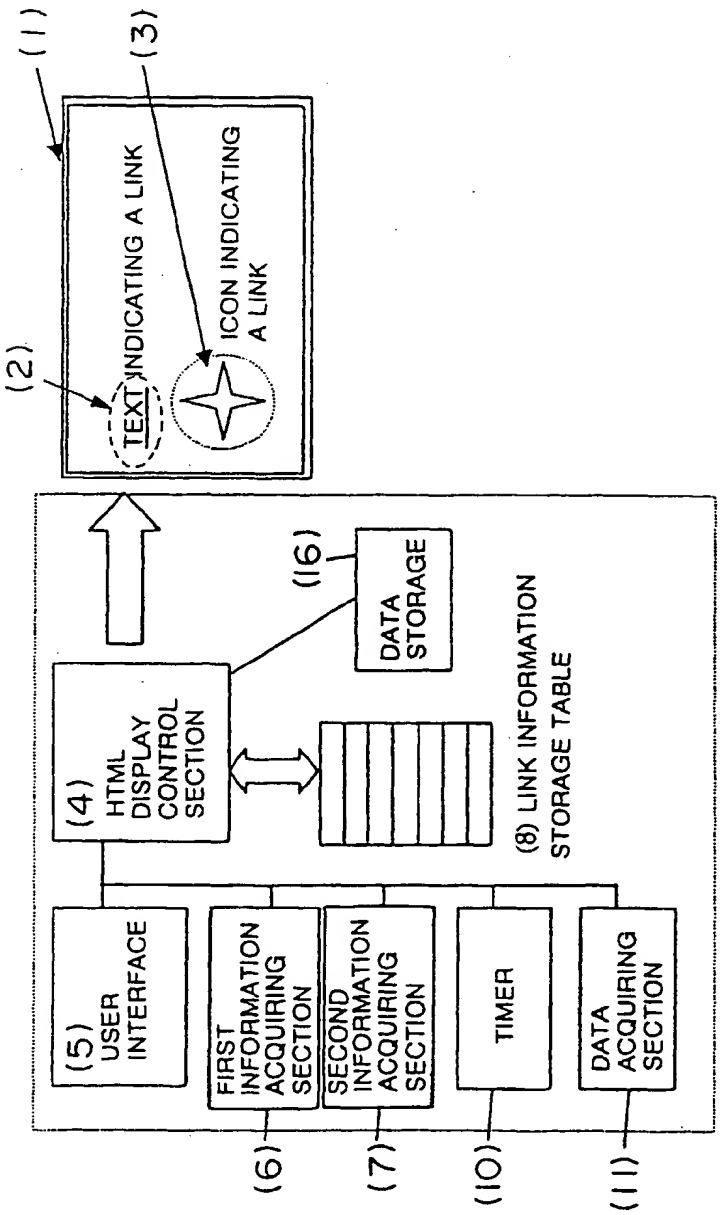

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FIG. 7

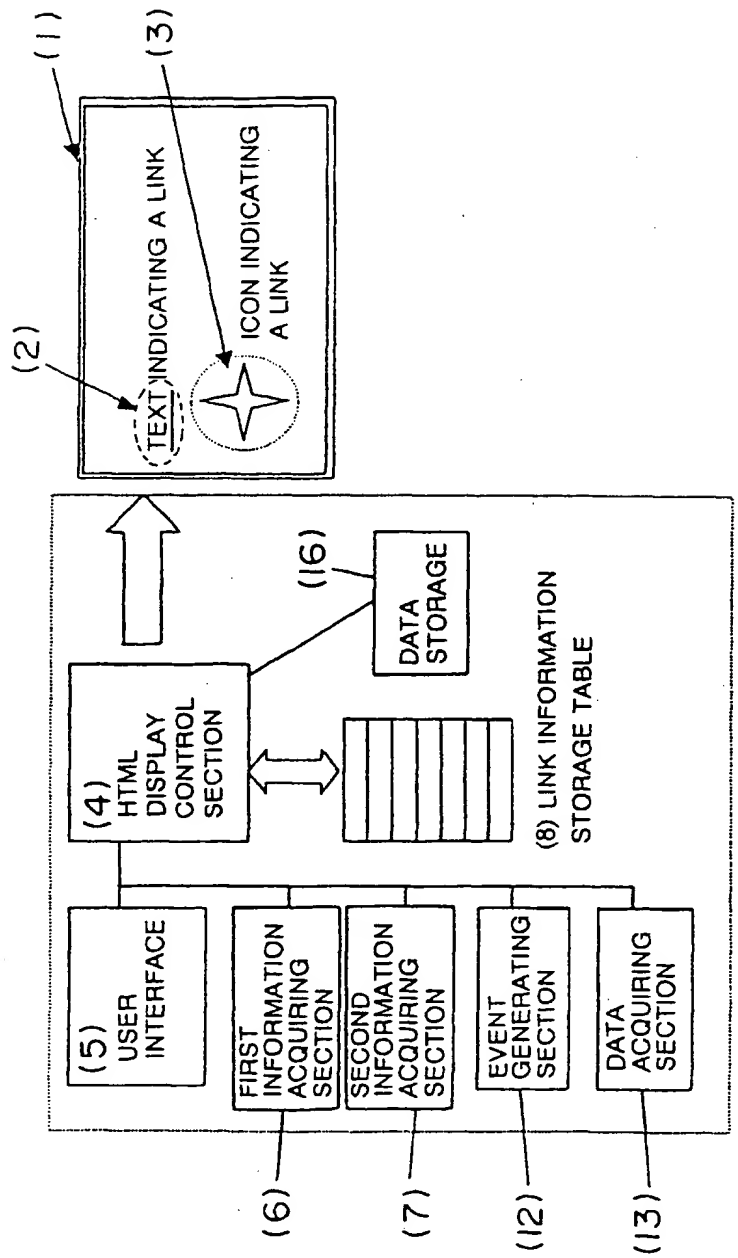

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FIG. 8

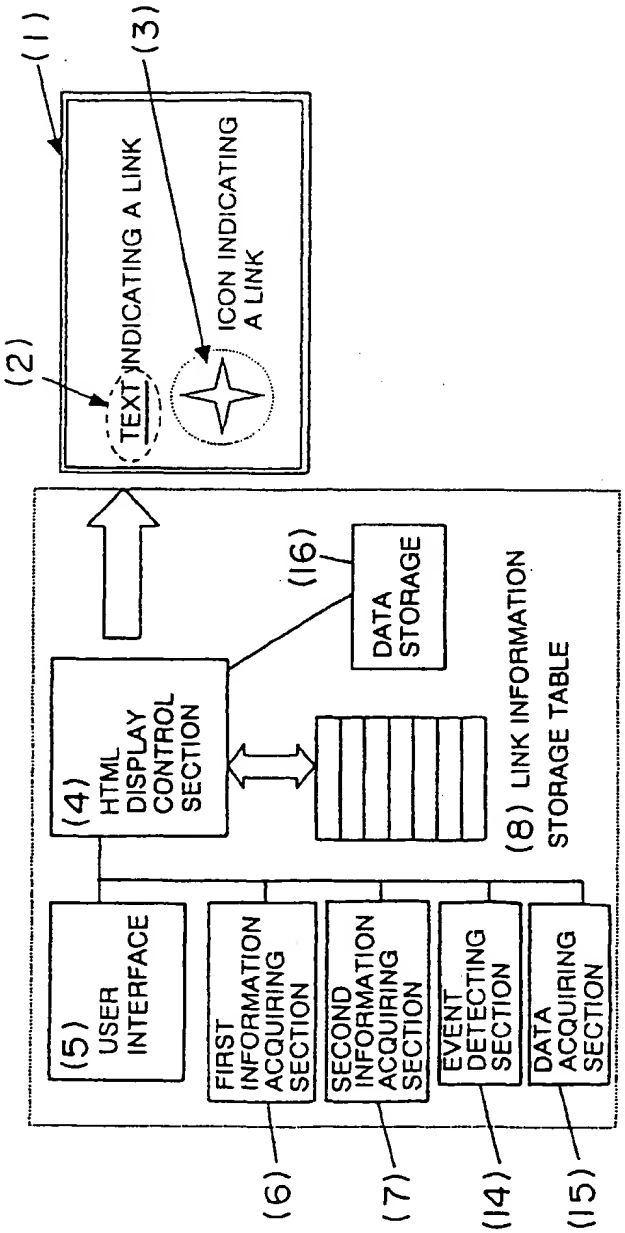

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FIG. 9

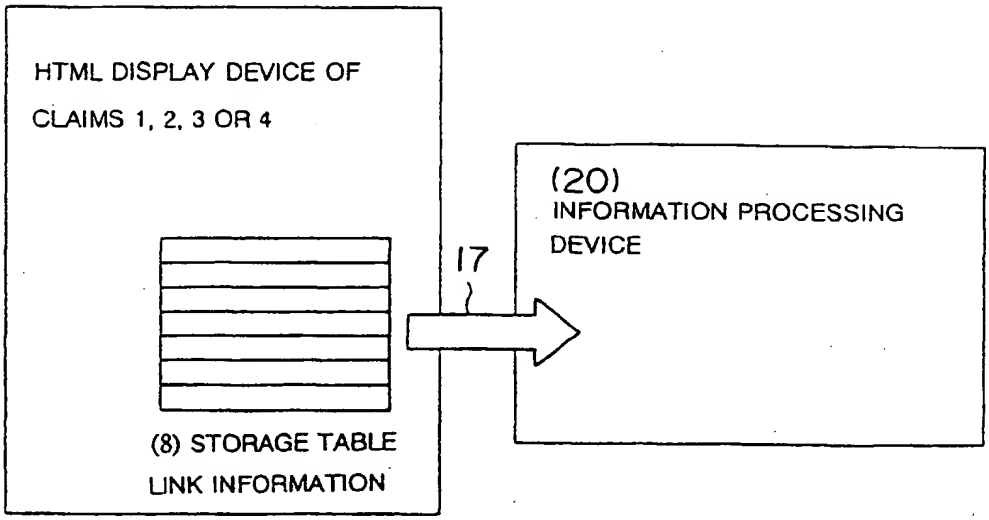

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FIG. 10

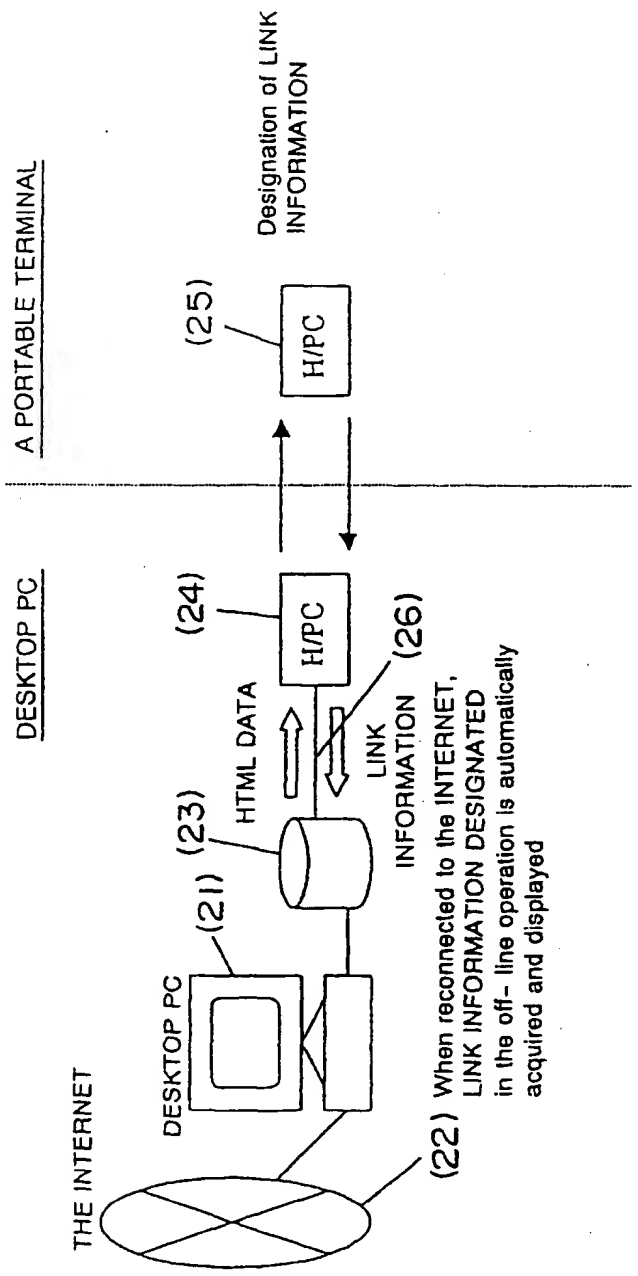

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FIG. 11

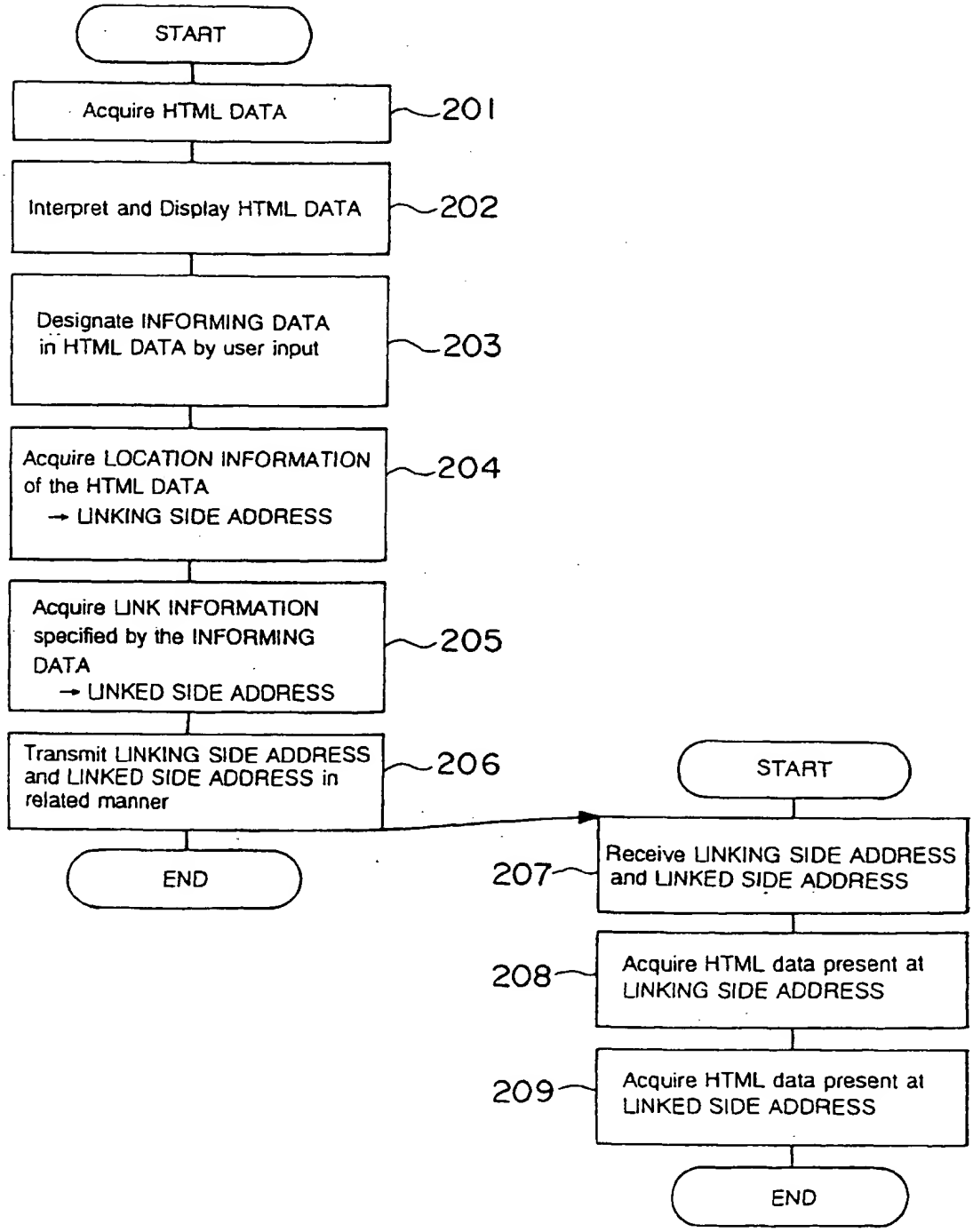

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FIG. 12

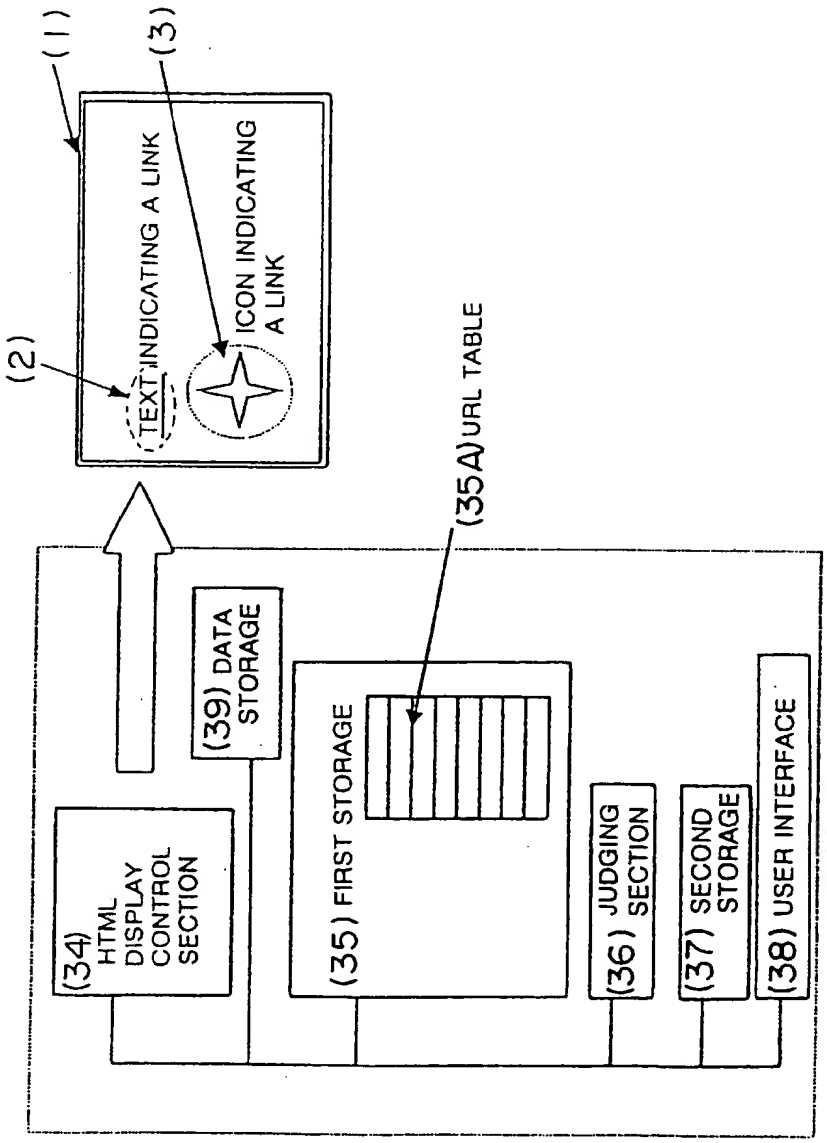

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FIG. 13

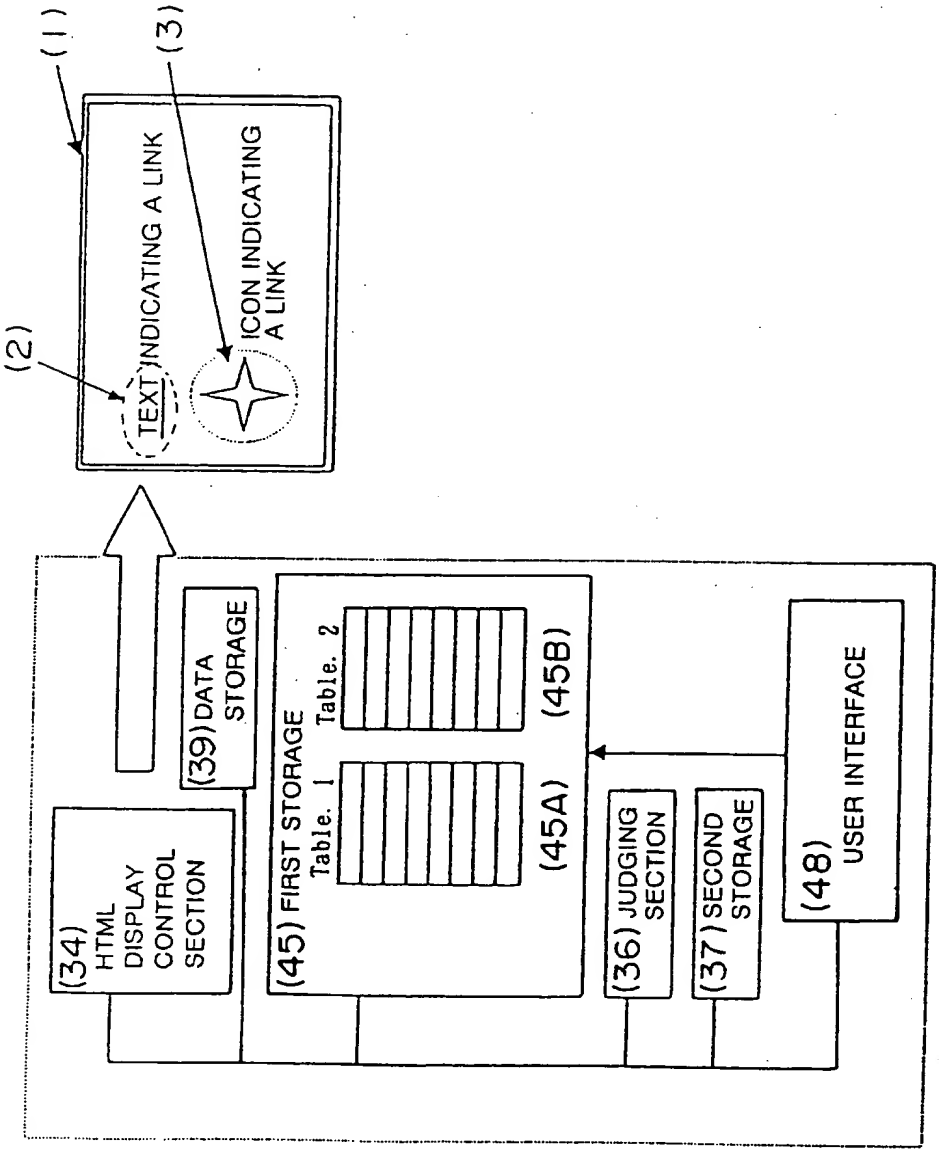

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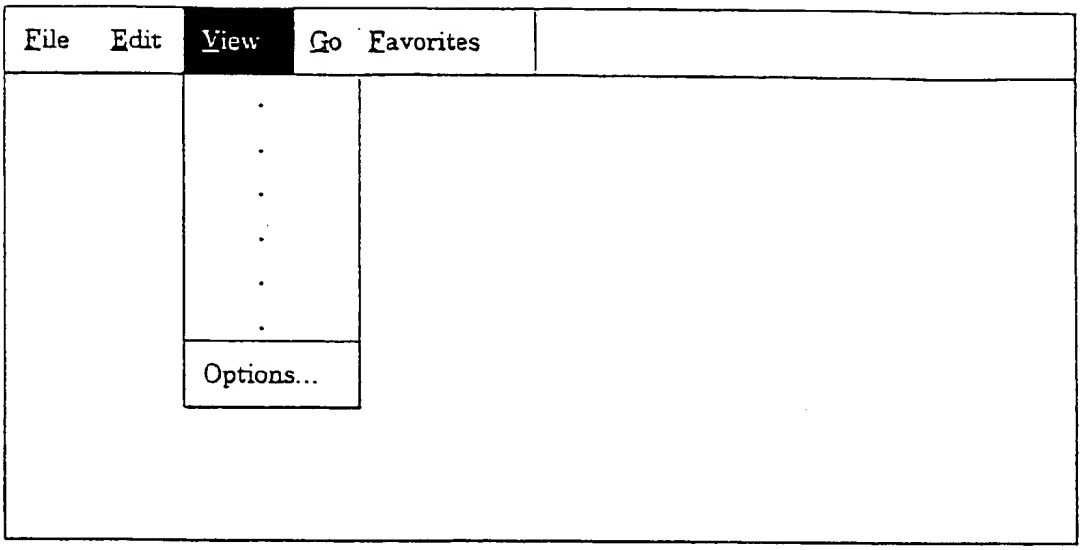
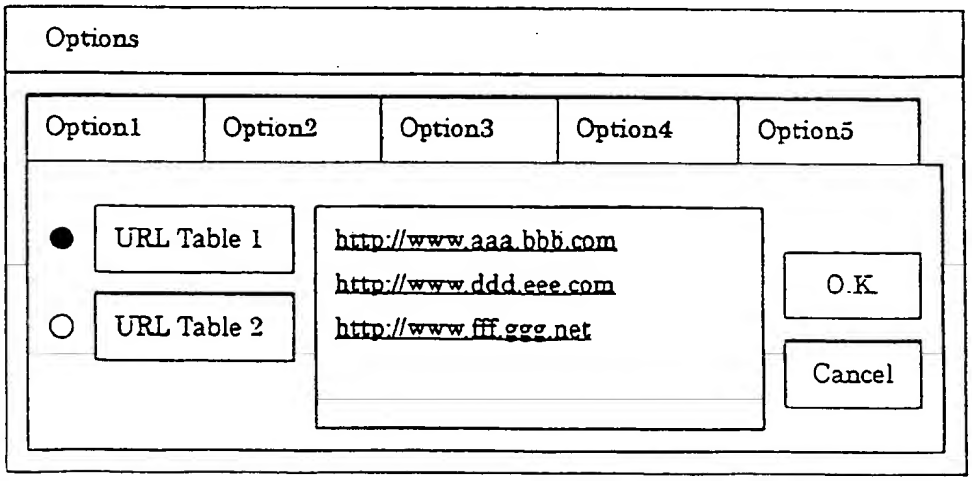
FIG. 14





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